

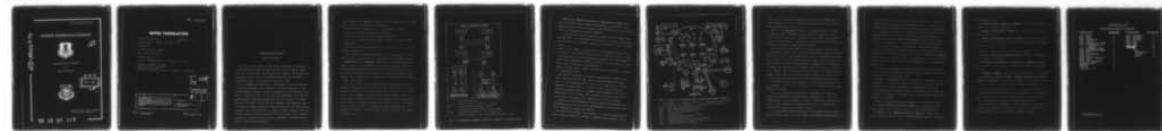
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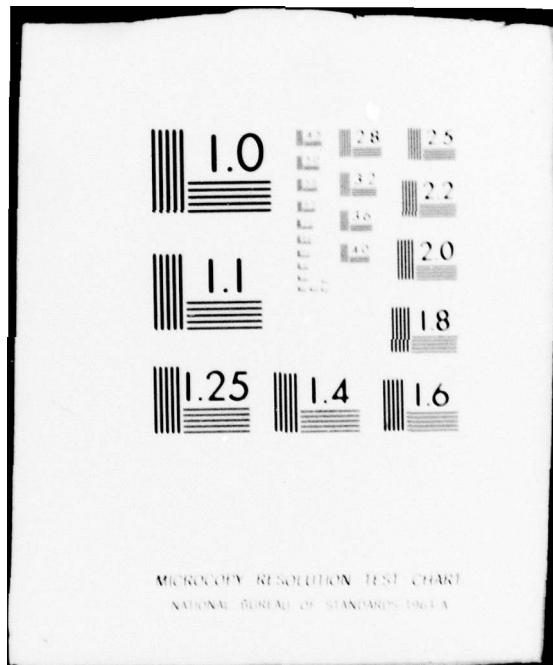
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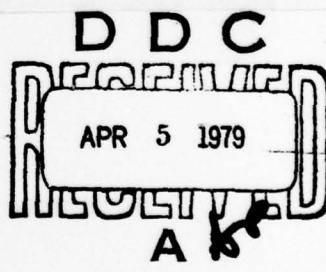


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"TELEPROCESSING SYSTEMS"

by

Antoni Gruszecki



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"Teleprocessing Systems"

Antoni Gruszecki

In April of this year the First Union Conference on "Teleprocessing Systems" was held in Riga (Latvian Soviet Socialist Republic); the conference was organized by the Committee for Science and Technology of the Council of Ministers USSR and the Institute of Computer Science of the Academy of Sciences, LSSR.

The conference was attended by representatives of the Committee for Science and Technology, industry, principal designers of the ES EVM [Unified Computer System], computing and communications scientific research centers of the USSR, and delegations from the Bulgarian People's Republic, Czechoslovak Socialist Republic, German Democratic Republic, Polish People's Republic, and Hungarian People's Republic. There were about 300 specialists in the developmental planning, use, and production of computer science centers. The conference formed a working platform for the exchange of views and experience by specialists with respect to methods of planned, initiated, or accomplished research.

The plenary proceedings took place in the morning, while specialists' sections were held in the afternoon.

The specialized sections were on the following subjects:

Section I - computer hardware and software

Section II - teleprocessing systems and networks

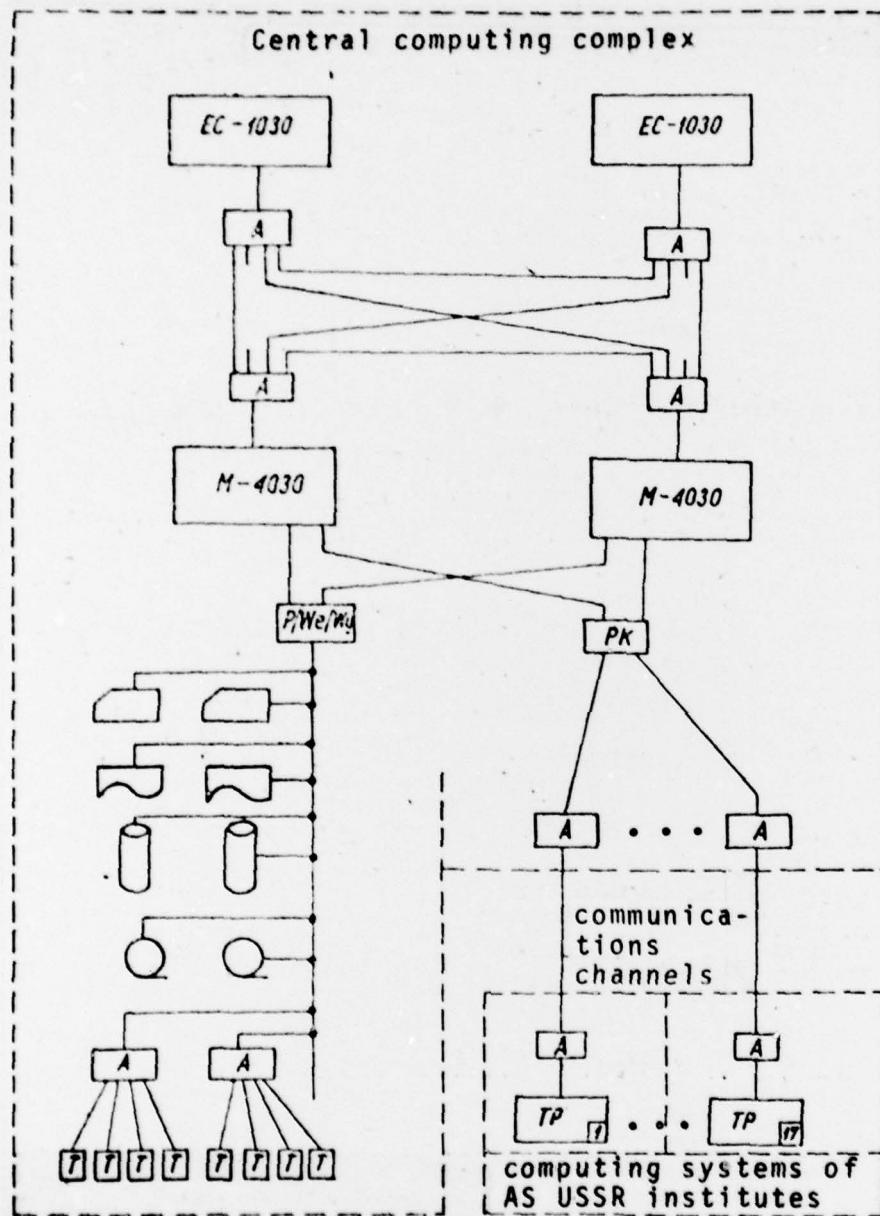
Section III - modeling and automated design of teleprocessing networks.

Eleven problem-oriented papers were delivered out of a total of 68 papers submitted.

Papers devoted to selected problems in the development of computer science applications were delivered at the plenary sessions.

Academician E. A. Yakubaytis, Director of the Institute of Computer Science AS LSSR, delivered the main paper, entitled "Multi-machine hierarchical data-processing systems and networks", which discussed international development of hardware and software and, against this background, the current state of development of applications in the USSR.

The final section of the paper contained characteristics from studies conducted at the Institute of Computer Science on the structure of a multi-access computer system which will serve the institutes of the Academy of Sciences LSSR (system diagram in fig. 1). In conclusion the author noted the justifiable need for organizing an experimental computer network in the USSR as a tool for studying computer processes and for verifying hardware and software solutions before they are introduced into systems directing the national economy.



A - interface adapter

P/We/Wy - processor for I/O equipment (M-400)

PK - communications processor (M-400)

TP - programmed terminals (M-400, R-10, WANG)

M-4030 - computer manufactured from SIEMENS 4004

T - simple terminals: CRT, printer with keyboard, etc.

Fig. 1. Experimental computer system for Academy of Sciences LSSR

Prof. G. R. Zakharov (Ministry of Communications USSR) gave a paper entitled "Data transmission networks and apparatus". The paper discussed crucial problems in the organization of the "Nationwide Data Transmission Network" (OGSPD).

A project for a data transmission network has been worked out and approved, with implementation expected in the near future (diagram in fig. 2). The project creates an enterprise in the following stages:

stage I (up to 1980) - organization (in the European territory of the USSR) of twelve main centers and zone centers, as well as their interconnections, by data transmission systems, for the purpose of conducting experimental studies of traffic flow, discipline in servicing users, procedures, and protocols;

stage II (after 1980) - gradual introduction of verified solutions on a nationwide scale.

The general operating principle of the network is based on the use of packet switching (KP), while retaining channel switching (KK). It is estimated that the network will serve about 7 million terminals of various types, of which 5 million will operate on switched telephone lines of a communications network with an assumed network load of about 10^{16} bits/year. The total outlays for construction and hardware are estimated at 30 million rubles.

Limitation of the progress of work is seen in the programming of communications processors and the programming of transmitting stations organized at computing centers.

The author of the paper drew attention to a serious underinvestment in data transmission networks, comparing some numerical indi-

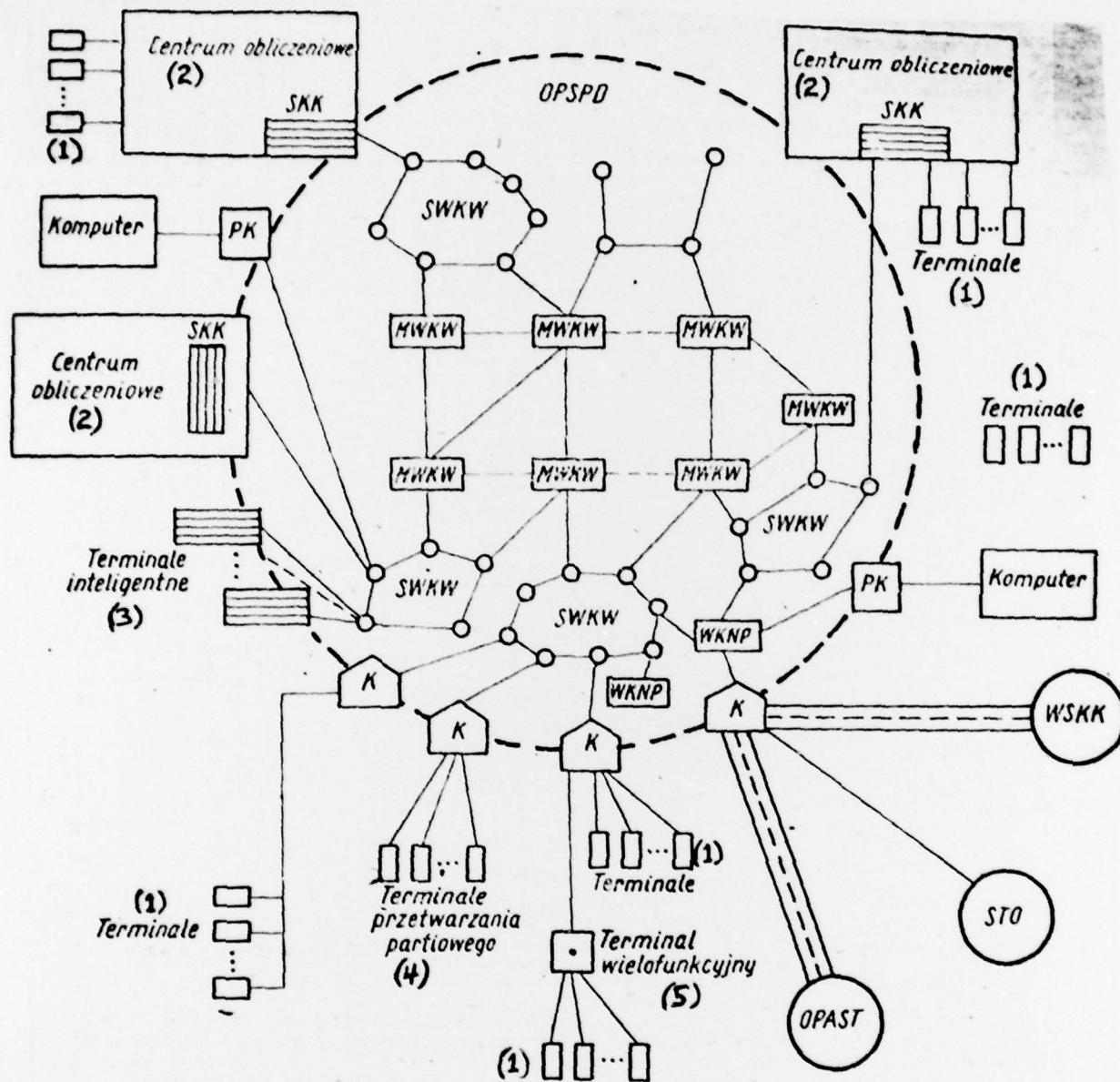


Fig. 2. Diagram of nationwide data transmission network (OPSPD)

- 1 - terminals; 2 - computing center; 3 - intelligent terminals;
- 4 - batch-processing terminals; 5 - multi-function terminal
- OPSPD - nationwide data transmission network
- MWKKW - main message-switching center
- SWKKW - zone of message-switching centers
- WKNP - lower-level switching center
- K - concentrator
- WSKK - channel-switching network center
- PK - communications processor
- OPAST - nationwide automatic telegraph network
- STO - general-purpose telephone network
- SKK - channel-switching network

ces. As it is, 70% of the outlays in the West are earmarked for data transmission, but only 19% in the USSR. The author felt that this was definitely too little.

Prof. V. O. Shwartsman (Institute of Communications of Academy of Sciences USSR) delivered a paper entitled "Problems and Prospects of data transmission development in the USSR". The paper included the main points of organizing a data transmission network on a primary network of communications channels.

The author felt that there is no need to build a special data transmission network, since existing communications channels can be used as a basis for data transmission; special communications lines are required only for speeds above 9600 bauds. The introduction and development of digital multiplication of channels will qualitatively change the structure of a network, which may lead to a qualitative change in the conception of packet switching in favor of using channel switching. In the future a data transmission network will be a secondary network based on a digital communications network.

The paper stressed the necessity of organizing experimental pilot systems, in view of the complexity of the problem and the large financial outlays.

It is also necessary to have close coordination of planning, hardware manufacture, and operational implementation. Since user requirements are very diverse in terms of information form and content, a data transmission network should employ a combination of methods most suited to the needs of users.

In the paper "Teleprocessing data of the COMECON Unified Computer System" Dr. Tech. Sci. V. S. Lapin (representing Working Group 7

of the Unified Computer System) described the state of work on the foundations for a unified teleprocessing system. He discussed basic problems associated with system architecture, hardware configuration, and program structure of computer facilities; applied (anticipated) models for controlling the data stream and hardware of a network; anticipated standards for records and procedures; general rules for compatibility of communications and channel interfaces.

The remaining problem-oriented papers described the current state of development of computer science and also discussed planned development. In the next few years the USSR is expected to organize about 200 large computing centers (including about 7 centers in the LSSR) gradually hooked into the OGSPD [Nationwide Data Transmission Network].

About 3000 computerized management information systems are currently operated in approx. 1800 enterprises and roughly 820 production-process control systems (ASU).

A need to standardize ASU's was pointed out, and there was emphasis both on the need to develop production of various types of terminals and on series production of communication processes.

The development of teleprocessing systems based on a modern data transmission network is regarded as one of the factors in national economic development.

Papers of foreign delegates delivered at the plenary session:

J. Julzari (Bulgarian People's Republic): "Some observations while working out the Unified TEL data teleprocessing system"

P. Bakani et al. (Hungarian People's Republic): "The use of small digital computers in data teleprocessing systems of the Uni-

fied Computer System"

R. Pegereit (German Democratic Republic): "A data teleprocessing system on the ES-1040 computer"

J. Battek (Polish People's Republic): "The Wroclaw Polytechnic teleprocessing system"

J. Pužman (Czechoslovak Socialist Republic): "The present state and possibilities of developing data teleprocessing for the Unified Computer System in the CSR"

Papers of Polish delegates delivered in sections:

W. Chałka (Institute of Communications): "Methods in synchronous data transmission networks"

A. Gruszecki (Secretariat of Committee for Computer Science): "The methodology of selecting the structure of processing-center networks"

T. Bańkowski (ZOWAR): "The teleprocessing network in ZETO-ZOWAR"

J. Maroński (Institute of Basic Computer Science of the Polish Academy of Sciences): "A preliminary project for a computer network at colleges and schools of the Polish Academy of Sciences"

The conference was characterized by work and good organization.

The papers laid special emphasis on organization of teleprocessing systems based on flexible programming using minicomputer systems (Hungary, Germany, USSR airline reservation system).

The authors also stressed the close cooperation in exchanges of software and teleprocessing hardware modules between the USSR and several COMECON countries (Bulgaria, Hungary, Germany).

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